RECONNAISSANCE SURVEY OF PINUS PINIFOLIA (Fitch) ON WHITE PINE IN WESTERN NORTH CAROLINA AND EASTERN TENNESSEE

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The purpose of this report is to summarize the observations of the damage to eastern white pine caused by the pine leaf aphid*, Pineus pinifoliae (Fitch) (Homoptera: Chermidae), in western North Carolina and eastern Tennessee during 1951. Observations on further damage to white pine will continue when the insect resumes activity in the spring of 1952.

The presence of the pine leaf aphid on red spruce and white pine in the southern Appalachians is not new. One of the earliest records of this insect in the Asheville files shows that a large number of young, planted white pine on the Nantahala National Forest, North Carolina were being killed by this insect during the winter of 1936-1937. The dying of terminal and lateral shoots of white pine on the Cataloochee District of the Great Smoky Mountains National Park was attributed to a chermid identified as Pineus pinifoliae (Fitch) in June 1939. A similar observation and determination from the same area was reported by R. A. St. George in December 1947. During the past two years reports of injury to white pine, attributable to this insect, have increased. Although the occurrence of this species on white pine has been reported, for the past 14 years, very little information is available as to its general distribution and relative importance on either red spruce or white pine.

This species produces cone-like galls on the current growing tips of eastern red spruce in the spring. During early summer a winged form leaves the galls on spruce, flies to the white pine, and lays eggs preferably on needles of the previous years' growth. When these eggs hatch, the wingless crawlers leave the needles, move to the current shoots, and attach themselves by their thread-like beaks (stylets). They remain immobile until the following spring, at which time they develop winged forms and return to the red spruce;1/ here they overwinter and cause galls to be formed the following spring. This cycle requires two years.

Any time after the young crawler stage of this chermid becomes established on the current shoots of white pine in early summer, injury can be expected to appear. The presence of this insect on the pine is usually not noticed until the current growth begins to turn brown and general "flagging" of the tips appear. A close examination of these injured tips with a hand lens or microscope will reveal grayish, tent-shaped, eliptical, almost scale-like bodies encrusted on the shoot. In cases of heavy infestations, entire limbs and trees have been known to die.

No external damage has been observed on the red spruce as a result of the formation of the galls, which eventually deteriorate and drop off.

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* Common name not approved by the American Association of Economic Entomologists.

1/ Balch, R. E. and G. R. Underwood. 1950. The life-history of Pineus pinifoliae (Fitch) (Homoptera: Phylloxeridae) and its effect on white pine. The Canadian Entomologist. 82(6): 117-123.

A survey[2/] during June 1951 revealed that approximately 30,000 acres, or practically all of the red spruce in the southern Appalachians, were infested by this insect. The heaviest gall production was observed in the dense spruce stands on Mt. Mitchell, North Carolina and vicinity and in the Great Smoky Mountains National Park.

From November 26 to December 5, most of the white pine areas in the western counties of North Carolina and extreme eastern Tennessee were inspected in order to observe the extent of injury to white pine and to obtain some knowledge of the location of the infested pine in relation to the red spruce type.

The areas of heavily and moderately infested white pine are shown in figure 1. All but one of these infestations was located within 7 air miles of the spruce type, but very lightly infested pine was found within a radius of 30 air miles. The largest infested area (Table 2.) covered approximately 10,000 acres of native white pine on the Cataloochee District of the Great Smoky Mountains National Park. It should be noted that heavy infestations of this insect on white pine have been reported in the past on the Cataloochee District and that this area is almost completely surrounded by red spruce within 5 air miles.

Although white pine is generally found in mixed stands in varying degrees with hardwoods and other pines in the southern Appalachians region, it may occur in pure stands in localized areas. In addition it is being extensively planted. There is not the mixture of red spruce and white pine which is found in Canada where considerable injury to white pine has been reported. The red spruce in the southern Appalachians is found at elevations of 5,500 feet and higher while white pine grows best between 2,000 and 3,500 feet.

The fact that white pine growing in close proximity to the spruce type has been heavily infested and damaged by this chermid, may be a reason for discouraging the planting of white pine in these areas in the future. However, before such action is taken more positive proof of permanent injury to the white pine stands is required.

2/ Merkel, E. P. 1951. Extensive Appraisal Survey of Pineus pinifoliae (Fitch) in Western North Carolina and Eastern Tennessee. Forest Insect Laboratory Report. Asheville, North Carolina.

TABLE 1: White pine moderately to heavily infested by Pineus pinifoliae in December 1951.

Area	Location	Approximate acreage	Native or planted	Amount of injury
1.	Burnsville, N. C.	1.0	planted	heavy
2.	Mitchell District Pisgah N. F., N. C.	0.5	"	"
3.	" " "	3.0	"	Moderate-heavy
4.	" " "	2.0	"	" "
5.	Black Mountain, N. C.	0.5	"	heavy
6.	" " " "	0.5	"	"
7.	Swannanoah, N. C.	2.0	"	"
8.	Sylva, N. C.	0.1	"	"
9.	Dillsboro, N. C.	500.0	"	"
10.	Cherokee, N. C.	0.1	"	"
11.	Cataloochee R. drainage, N. C.	10,000.0	native	moderate-heavy
12.	Coweeta, N. C.	0.1	planted	" "
13.	Fontanna Dam, N. C.	0.2	native	heavy
14.	Gatlinburg, Tenn.	0.1	planted	heavy

Figure 1: Areas of White Pine in Western North Carolina and Eastern Tennessee Lightly and Heavily Infested with Pineus pinifoliae (Fitch) in 1951.